AFFIDAVIT
DESCRIBING UNMONITORED AIRBORN EXPOSURES OF URANIUM
AT
NUCLEAR METALS, INC., WEST CONCORD, MASSACHUSETTS

Introduction

I, , residing at , provide this affidavit to describe discrete and unmonitored radioactive material exposures that occurred during my employment between 1977 and 1983 at the Nuclear Metals, Inc. West Concord manufacturing facility. In addition, I present other information submitted with this petition in support of a Class of all employees who worked at NMI between 1970 and 1983.

I will present evidence of unmonitored airborne exposures that were quite frequent and the result of developmental and experimental processes for improved capabilities in radioactive waste disposal methods, uranium recycling techniques, improved uranium heat treatment processes, UF_4 reduction production processing, and new alloy development and foundry practices. Unmonitored and/or lost exposure records that apply primarily to internal exposures are of greatest concern for their potential to have endangered employees and result in an inability of NIOSH to accurately perform dose reconstructions. It is unlikely that NIOSH is aware of the scope of unmonitored exposures presented in this petition.

I am particularly gratified by the support I have received from fellow workers at NMI to provide the time and support that was required to prepare this petition. Quite a few of these workers are prepared to support an outreach to these employees for additional fact finding. A listing of NMI employees along with initial contact information is provided in Appendix G to this affidavit. Supporting affidavits are provided in Appendix E.

All photographs presented in this affidavit are from my personal collection of project photographs that were used to document tests and results for both internal and published technical reports. Copies and excerpts from these reports are provided in Appendix D. Lastly, scanned copies of all documents and report excerpts submitted with this petition are provided on CDRoM. A separate DVD is provided with a foundry practice video clip and a marketing video on NMI.

In all cases, developmental processes that are presented here were excluded from any requirements for the generation of Radiation Work Permits prior to the conduct of any experiments. Such Radiation Work Permits were not required. This requirement could have provided advance consideration of unplanned fires, releases of contaminated radioactive particles and explosions and would have resulted in the definition of protection measures that were not implemented to mitigate potential exposures to airborne contamination.

The range of unmonitored exposure events, unreported violations of safety practices, lost records and poor health & safety practices is but a part of many more instances for which have only a limited knowledge. When combined with other affidavits of unmo4nitored and unsafe activities, reported violations of H&S practices supported in Appendix A and I, they provide a collective justification for the requested SEC petition review and approval.

Occurrences that I recall include, but are not limited to, the following specific activities.

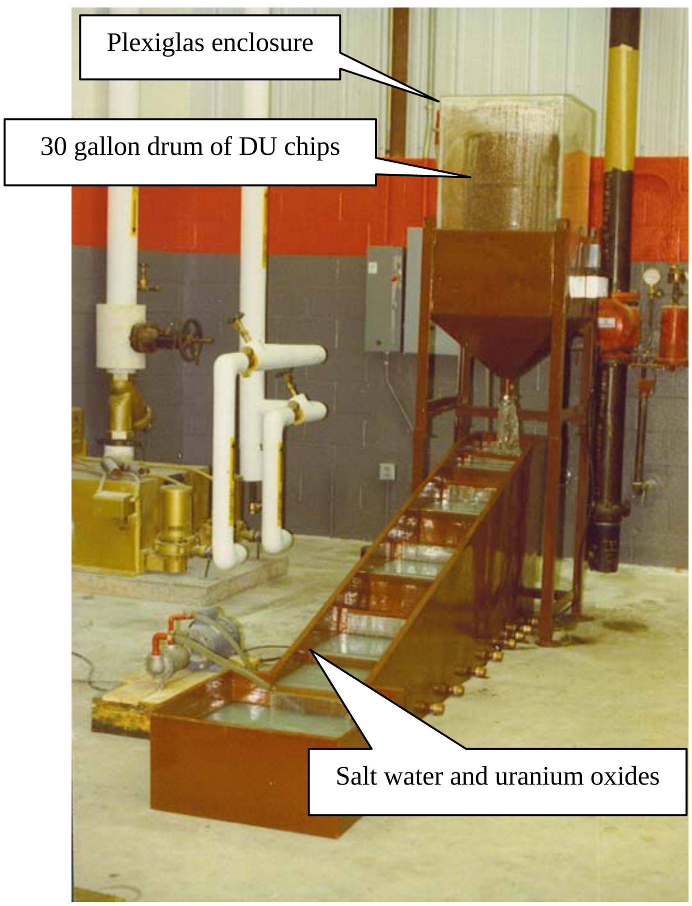
1. Salt Water Processing of Uranium Machine Chips Resulting in Unmonitored Fire and Explosion

Location: Building D (dedicated October 1978)
Approximate Date: early 1979
Government Contract: Internal Funded R&D
Additional Supporting Documentation: Test Stand Photograph

designed and built an experimental rig to use salt water to convert uranium machine turnings to uranium oxide. The process was to create a slow oxidation of the chips to convert them into stable and compact oxides without resorting to incineration that would have required special permits and local/State approvals.

Building D had been recently completed and had absolutely no equipment as yet installed.

The first time the rig was used filled a 30-gallon steel drum with machine turnings to which a salt-water spray was placed above the drum in the Plexiglas enclosure shown in the photo. As the water drained from the drum it was filtered and recycled.



The process appeared to be working as planned when headed home for the day. That evening was recalled to the plant in response to a Concord Fire Department call when the fire alarm was triggered. The plant was filled with smoke and had managed to completely contaminate the new plant. The test rig was in shambles, the Plexiglas cover had melted and was blown aside by the explosion.

pieced together what had happened. The water was dissociated by the uranium and released hydrogen and oxygen. These gases collected in the Plexiglas dome. At the same time uranium chip size was shrinking as the surface oxides were formed and washed off the chips. This created in exponentially increasing surface to volume ratio in the chip that accelerated chemical oxidation and water dissociation. The process released increasing amounts of heat that further accelerated chemical reactions. When the chips auto-ignited the fire touched off the hydrogen and produced the explosion.

You will notice in the photo that there were no provisions for ventilation. In addition, the wore no personal respirators or Personal Air Monitors (PAMs). I have no idea what kind of airborne exposures received from these experiments. The rig was not rebuilt or ever used again.

2. Development of a Foam Encapsulation Alternative to Concrete for Machine Turning Packaging for Shipment and Burial Resulting in Unmonitored Fires and Airborne Exposures

Location: Butler Building and External Test Stand
Approximate Date: 1978 – 1981
Government Contract: Internal Funded R&D
Additional Supporting Documentation: Photographs, Appendix D

spanned several years to develop and evaluate WR Grace's Hypol foam as a uranium chip encapsulating media during which time numerous unmonitored uranium fires were experienced. Much of this work was performed with assistance from and . Copies of a sampling test reports and photos are provided on Appendix D. Additional test reports are available.

A specially design blending machine was purchased to mix Hypol resin and water with an injection system that allowed us to inject the mixture into a 55-gallon drum containing 100-200 pounds of uranium machine chips. The polyurethane foam would expand from the bottom of the container to the top. I can be clearly seen in the photo injecting foam into a test barrel. It is quite evident that was a that got directly involved in the work.

Excess foam was vented through a expanded metal lid. This excess foam was cut by hand using a tree bow saw so that a lid could be fixed to the top of the drum. After encapsulating the chips in the

foam, the drums were capped and placed in the heating test rig shown in the photo. This rig would apply a strike anywhere match shipping standard to the package. Specifically, the package would need to withstand an internal temperature of 170-180 ^{o}F for eight hours without auto ignition.

passed this standard. However, there were several occasions after power was turned off when the internal temperature of the package continued to rise. At a time of approximately 16-24 hours into the test the package would auto ignite or explode. Explosions were attributed to accumulated hydrogen from water dissociation.

These fires would cause the Type K thermocouples to melt even though they had an upper temperature limit of 1900 °F. In addition, prodigious amounts of smoke were generated. You can see from the photo that there was no provision for ventilation of the test area. The control area where we used recorders to track package temperature was located about 10 feet from the test pit.

Crude outdoor drum heating test stand. 55 gallon drum inside 85 gallon drum filled with anti-freeze. Insulated to reduce heat loss.

A particular processing problem and hazard was identified. Hypol resin contained volatile isocyanate compounds (see Appendix D spec sheet). Technician exposure to airborne isocyanates resulted in allergic reactions and respiratory distress problems. We were not monitoring for airborne exposures of radioactive particulates inside the Butler building during the experiments or at the test site where many fires and explosions occurred.

Prior to switching to anti-freeze, heated quench oil was used to heat the test drums. This test drum was removed after testing and is coated in oil. The drum collapsed from a vacuum produced by oxidizing uranium chips that scavenged available oxygen inside the drum.

It was found that worker sensitivity and the onset of allergic reactions increased with increasing exposure. Some with high sensitivities had to be permanently transferred to other duties. If the isocyanate fumes were being released to the work area it is highly probable that unmonitored contaminated radioactive particulates were also airborne.

Employee performing crude DoT impact penetration test behind Building C to test for foam barrel puncture resistance.

Process development fires exposed us to many opportunities for airborne contamination that was not monitored with PAMs nor were we wearing personal respirators.

prepared and submitted a report to the Department of Social and Health Services, Olympia, WA, entitled “The Use of a Polyurethane Foam as a Dispersing and Encapsulating Medium for Depleted Uranium Machine Turnings”, dated 17 April, 1981. However, the final blow that ended any chance of using this approach came when shipped some developmental

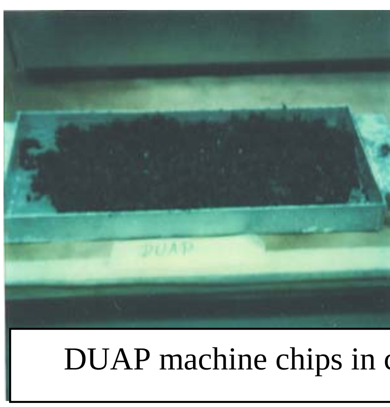
foam-uranium drums to Barnwell, SC, or Hanford, Washington disposal sites. The site photo shows NMI drums being dropped into a disposal pit. They had a long way to drop. When one of the drums was dropped a spark was generated which caused the drum to explode. assumed this explosion was caused by accumulated hydrogen that pressurized the drum as hydrogen was released by the dissociation of water by the uranium.

3. Uranium Chemical Recycling Development Resulting in Unmonitored Airborne Releases of Uranium Tetrafluoride, Uranium Oxides and Uranyl Fluoride, and their hydrates

Location: Building A Chemistry Laboratory (Art Dodge's Lab)
Approximate Date: 1980-1983
Government Contract: M774 Machine Chip Recycling", DoD Contract No. DAAK10-80-C-0246, September 1980 and June 1983.
Additional Supporting Documentation: Photographs, USAARDC Report No. ARLCD-CR-83018, Appendix D

This recycling development work involved the treatment of uranium machine chips with HF acid in order to create Uranium Tetrafluoride (UF_4) that could be used to reclaim usable uranium metal. An unfortunate by-product of the HF treatment was Uranyl Fluoride (UO_2F_2) and UF_4 hydrates that contaminated the UF_4 and depressed UF_4 reduction yields. Excerpts from the final technical report can be found in Appendix D.

Approximately 5 pound batches of uranium machine turnings were treated with gallon quantities of HF acid in plastic trays positioned in the acid hood. The performed these reactions and subsequent processing. relied on the negative pressure of the vent system to capture all fumes during reaction. UF_4 precipitate was washed, dried and ball milled in the lab. No additional filter masks or PAMs were used to prevent and monitor exposures.



DUAP machine chips in chemical treatment tray

Graphite Lined mini-bomb reduction vessels (approx 12" tall)

After experiments were completed over a six-month period, all lab chrome was corroded or removed from lab furniture and the windows were frosted from exposure to HF acid fumes. were left to wonder what else escaped to contaminate lab air while working there? The chemical process used produced an ultra fine particulate precipitate that included UF_4, UO_2F_2 and their hydrates. The literature describes these uranium compounds as highly soluble and kidney targeting. This was a very severe situation for unmonitored airborne contamination.

These highly soluble compounds are flushed from the human body rather quickly so there would be no evidence of their uptake in internal dosimetry data from the mid 1980s, as in my case. Since I ended up with this unmonitored exposure was probably the most damaging during my employment. Lastly, how can a single data point from the late 1980s be considered a statistically significant and accurate exposure sample?

Small bomb reductions were made using the lab resistance heated furnace. Small derbies of uranium metal were removed from the graphite reduction vessel liner by using a hammer to break open the reduction product. There was a fine debris of uranium oxides and contaminated graphite released by this extraction process.

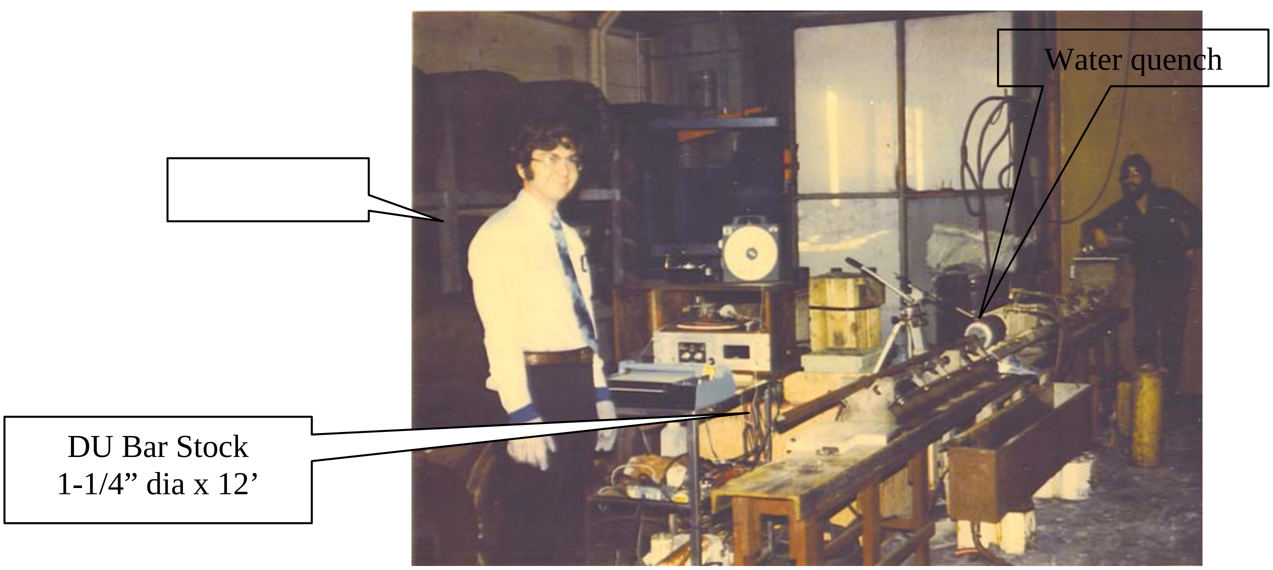
This activity included a rather violent effort needed to break open the graphite liner with a hammer. No special provisions were taken, like personal respirators or PAMs to protect and monitor during these efforts.

The final Technical Report produced under this contract provides evidence that these experiments were conducted as described. Additional reports were authored in 1980 by Worcester Polytechnic Institute entitled “Nuclear Waste Engineering” and “Nuclear Waste Chemistry” for work I sponsored with the Department of Chemistry regarding methods to inhibit the formation of Uranyl Fluoride during aqueous fluorination. These reports are accessible at the Gordon Public Library of Worcester Polytechnic Institute and describe the chemical analysis of the product we created. Excerpts from the report can be found in Appendix D.

4. Continuous Induction Solutionizing of Uranium Bars and Unmonitored Contaminated Process Water Exposures

Location: Building C, 1400 Ton Extrusion Press Area
Approximate Date: 1979
Government Contract: Internal Funded R&D
Additional Supporting Documentation: Photograph of heat treatment activity

assembled a rig that was designed to continuously induction heat and



water quench large diameter uranium bars. This required to feed the rod at a controlled rate of 15-18” per minute through an induction-heating coil that would raise bar temperature to approximately 1550 ^{o}F. At this temperature the bar glowed red hot and quickly oxidized on the surface. The rod was continuously rotated and fed into a quenching water can that sprayed water on the bar to quickly cool it to room temperature.

The feed mechanism of this rig would become unstable as the soft rod would bend. Since it was rotating, this bent bar would lift the induction coil and quench can that would short out the induction coil and spray us with water contaminated with uranium oxides.

These experiments were conducted near where the 1400-ton extrusion press abutted the foundry in Building C. This was so we could tap into the power supplies of one of the 100 kW motor generators for our induction coil. This, and other project photos provides further evidence that was a involved in and had first hand knowledge of the exposures reviewed in this petition. was not pleased when would come home all soiled from these experiments.

No individual respirators, ventilation of the area or PAM monitoring was used during these experiments. I estimate that there were at least 12 occurrences where got drenched with contaminated quench water.

5. Uranium Alloy Development and Unmonitored Exposure to Used Crucibles

Location: Building C, Foundry
Approximate Date: 1979 - 1982
Government Contract: USAF ManTech Program, Contract No. F33615-82-C-5044, USAF Contract F0835-79-C-0267, Appendix D
Additional Supporting Documentation: Photographs of work, DVD Video

As part of this USAF contract, was tasked with attempting to produce a quality alloy of 6.5% niobium and uranium. This is difficult to do due to the very high melting temperature of niobium compared to uranium, particularly when attempting this in a vacuum induction furnace. Because had to take the metals to higher than typical temperatures while using graphite crucibles, had to develop improved mold and crucible coatings for the graphite.

removed foundry crucible residue of unmelted Niobium pellets and uranium. Higher temperatures were required, necessitating the development of better mold wash coatings. Alternative VIM process to Rocky Flats eb melting trials.

This required to bury upper body inside the previously used crucible in order to apply several applications of the new coating slurry with a brush. During these times was exposed to high radiation levels and yet belt mounted dosimeter was outside the crucible and was less likely to record accurate exposures. No ring badge, PAM or personal respirator was used during this effort.

USAF Mantech castings – unalloyed DU for sheet rolling to reproduce Oak Ridge Y-12 material produced for LANL.

When performing the melts and casting would assist the . had to observe the melt and make on the spot decisions as to hold times and peak temperatures before authorizing the pour. remember this period because eating, smoking and drinking were still permitted i Para 3 Para 7Page 18 Para 4n the . would bring their coffee and newspaper to read during the lengthy melt and cast cycles.

would delight in demonstrating to the technique for pacifying the top crucible lid when they opened the furnace after cool down. This was an event since the melting process would distill uranium and daughter products onto the underside of the lid. This finely deposited material was very pyrophoric, almost explosive. They would pop the lid and hit the underside with a spray of water from a spray bottle. This caused instant detonation of the distilled residue and a flash of flame. The volume of flame that was produced would overwhelm the 4" diameter vent pipe placed in the general area. did not wear personal respirators during this step and I'm certain we were exposed to unmonitored airborne contamination. General monitoring of the work areas would not capture these releases.

, a and , has provided a movie clip that shows this furnace lid explosion. It includes a slow motion sequence of the flame that is produced along with a loud explosion. It becomes quite clear from this film that the sudden release of energy from this typical lid reaction would overwhelm the 4" diameter flexible vent pipe that was placed in the general area.

What is not shown in the video clip are the three other people watching the action and recording the video. While the is attired in all the safety equipment, some of which was not commonly worn in the late 1970s, the observers were unprotected. The is knocked down from the explosion and some of the observers were burned. The flame and release of airborne contamination would quickly overwhelm the small vent pipe placed in the area of the lid. not sure how much of the airborne exposure would have been captured by one PAM placed in the general area.

The final step of these casting trials was to inspect the crucible for unmelted residues as this was a common occurrence for these experimental alloying processes. getting very near the internal surfaces of the used crucible with in order to make observations. wasn't even wearing plastic safety goggles to protect from radiation exposure. At a very young age that will require medical treatment in the future.

Mandatory use of safety goggles was not required until after 1983 and enforcement was loose for many years.

In later years learned that used crucibles would accumulate thorium and daughter products that made them particularly radioactive. A cool down period was introduced in later years to permit used crucibles to reduce rad levels before being re used. Also, a holding area and steel, then aluminum, covers were instituted in order to allow tooling to cool down before permitting their reuse. This practice was implemented after 1983, greatly increased the cost of foundry operations and was resisted by management for many years.

inadequately monitored activities exposed to unknown and high radiation levels.

6. **UF_4 Reduction Process Development and Unmonitored Airborne Exposures**

Location: Building D, Reduction Facility
Approximate Date: 1979-1982
Government Contract: unknown
Additional Supporting Documentation: other affidavits and Appendix I

After the completion of Building D construction, facilities were installed to produce unalloyed uranium derbies from the reduction of UF_4 blended with magnesium chips contained within a graphite-lined container. This process would yield 1800-pound derby shaped ingots.

This was the most hazardous area to work in at NMI, West Concord. Monitoring of employee exposures, particularly to airborne contamination was extremely poor. Accidents that produced airborne contamination were frequent as process approaches and improved tooling were constantly being developed. hope to have affidavits by other employees who recall similar incidents that report here. No one had prior experience with the reduction of UF_4 to uranium metal. As such, learned and gained experience from the many failures.

This was particularly troublesome as the failures were dramatic, such as vessel burn throughs, or with extreme airborne exposure situations where PAMs and respirators were not used. Extreme airborne exposures were evident everywhere. This includes the areas where magnesium fluoride slag was removed by hand from derbies, the UF_4/magnesium blending station, reduction vessel transfer failures (that resulted in unexpected and major spills) and packing reduction vessels to achieve the required packing densties.

would have occasion to work in this area as part of my process engineering responsibilities. When would be working in the processing area noticed that most of the process equipment was covered with a light green tinted deposit of UF_4. There was a device for blending UF_4 (green salt) and magnesium chips where the 55-gallon drums of green salt were emptied into a blender. The caked green salt would sometimes release suddenly from the drum and create a cloud of dust in the process area.

A green colored dust suppression material was used to sweep up the green salt deposits on the floor. Many of us suspected this color was used to hide the contamination and questioned why other colors of dust suppressant weren't used. In addition, using sweeping as method would tend to re-suspend some of the dust, not a smart way to do it. cannot believe that this wasn't clear evidence of high airborne concentrations that didn't seem to concern anyone. work in this area did not require to wear a respirator.

The was a manual intensive process where the magnesium fluoride slag by-product was chiseled off of the derby. The ventilation station was awkward to work in so the technicians would remove the derby and de-slag the derby in the open air. The manual chisel method was dirty and hard work. never saw these with respirators or PAMs. Occasionally they would have respirators around their neck so it would not interfere with their breathing. Respirator enforcement was lax.

Manually packing the UF4/magnesium blend into the reduction vessels was performed manually to make sure packing density was sufficient for good yields. This also produced high airborne exposures that were not, or inadequately monitored. Occasionally a would drop a filled vessel with the hydraulic clamping jaws used to grab and transfer vessels in the process area. When one of these vessels was dropped, it would fall over and spill the contents onto the floor. This produced a big cloud of dust and extreme airborne exposures.

In house vacuum systems were used to vacuum up spilled UF_4. On occasion this would over burden HEPA filters causing ventilation to fail in Building D for the reduction and machining areas. In addition, summer brown outs and belt drive failures would also cause vents to shut down. Power failures and brown outs were another safety problem as these would lead to vacuum pump failures in foundry furnaces. When failed to respond quickly enough to shut off key valves in a power failure, the loss of vacuum caused occasional furnace explosions. In one such explosion Dick Santangelo, the foundry foreman, was severely burned. At least on e other t refused to go back and work in after that accident.

do not recall the operation ever being shut down. Production demand for metal was so high that a disruption in production would idle all of the workers. There was tremendous pressure to keep the operation going. , a at the time, shared with some of his experiences. His recollection of management pressure included the threat to fire one employee that was complaining too much about the poor health & safety practices. has committed to providing an affidavit of his experiences.

As with , there was also a problem with graphite reduction tooling that accumulated distilled thorium and radioactive daughter products. am not aware of any provisions that were ever made to allow a cooling off period for this tooling before reuse in West Concord. After the process was relocated to Carolina Metals, Inc. (CMI) in Barnwell, SC, believe they instituted a tooling rotation approach to allow used tooling to reduce radiation emissions before reuse.

In the early months of starting the process and tooling was not mature. As a result, had a number of burn-through events. These were events of molten uranium metal and magnesium fluoride that would find a weakness in the steel encased graphite container and get ejected. This ejection was violent and sudden. These chemical reactions are referred to as “bomb reductions” in the literature. They are called this for good reason, as the chemical reaction is sudden, quick, and extremely exothermic. The heat release upon reaction is sufficient to maintain the entire contents in a molten state for a sufficient length of time to permit the dense uranium to separate from the molten and lighter magnesium fluoride by-product.

If there was any monitoring of airborne exposures during these burn-throughs am unaware of their availability. During one such burn through, the flame escaping from the reduction furnace positioned below floor grade, was like the launch of a ballistic missile from a silo.

These reactions would produce some of the highest radioactive sources from the distillation of lighter daughter products that would contaminate process tooling. Unmonitored Radon generation was also an unrecognized problem and was never monitored.

In the late 1990s there was a radon contamination problem uncovered in the green salt storage facility at our sister plant, Carolina Metals. If there was a radon problem at that facility, there was likely an unmonitored radon problem associated with green salt at NMI West Concord. Appendix I includes several technical reports on Radon generation from depleted uranium authored by the NRC and Utah Dept. of Health.

These reports make the interesting observation that humid, or wet storage of DU would release more Radon than in arid disposal environments.

NMI used water-soluble coolants in lathes during machining and stored chips under water in 55-gallon drums before transport to the Butler Building for waste processing. The high surface area of these chips in water would oxidize and cause the water to dissociate into hydrogen and oxygen. This would expose fresh surfaces for oxidation and perhaps greater Radon release.

From discussions with several radiation health physicists and a review of the technical literature, there is a general view that the UF_4 used by NMI was highly refined. As such, the prevailing view is that there is such a small fraction of the progeny that can decay into Radon that depleted uranium should not be a major source for this hazard. However, there are two technical reports that show this prevailing view is seriously flawed.

In a January 2001 WISE report, updated in 2005, the DoE disclosed in 1999 the contamination of DU with transuranics and U-236 from spent nuclear fuel recycle between the years 1953- 1964 and 1969-1976. This contamination, including plutonium-238 and -239, U-236, americium-241, neptunium-237 and technicium-99 were found in the stockpile of DU penetrators and DU armor used in the Kosovo conflict and elsewhere. Technetium-99 is a fission product. Further, there was only sporadic monitoring of plutonium concentrations in DU in the metal made from the years it was fed into the cascade process at Paducah. This indicates the potential for a higher percentage of the radionuclide progeny that can decay into radon generation in the DU processed at NMI, West Concord. This disclosure seriously undermines the consensus view of the limited radiation hazards for depleted uranium.

[It is interesting to note that was denied online access to the DoE press releases that are referenced in the WISE (World Information Service on Energy) documents. Special access authentication was required.]

It would also be useful to know whether NIOSH has factored this contamination into their dose reconstruction estimate models for NMI claimants?

A September 2000 report authored by Radioactive Waste Management Associates and downloaded from the Massachusetts DPH web site indicates that 800 pounds of U_{235} is present in the Holding Basin at NMI. This Holding Basin is where neutralized nitric acid was dumped after “pickling” extruded DU bars to remove the copper cladding. The source of this significant quantity of fissionable isotope may have been the recycled fuel rod material disclosed in the WISE report. It is further evidence that higher levels of radionuclide progeny that can decay to radon were present in the uranium processed at NMI, West Concord.

Excerpts from a recently published Health Physics text reviews the differences between fresh and aged DU and the prospects for radon release. Basically, aged DU has a greater likelihood for radon release because the stored DU has time for decay products to reach equilibrium. “DU health physics aspects would then become similar to those applied to uranium in general.” This is interesting in that the initial UF_4 received at NMI, West Concord, for reduction came from old government stockpiles. This text opinion was also made without the knowledge that the DoE was recycling spent enriched fuel rod uranium in the DU cascade process that produced the UF_6 and UF_4 held in its inventory and was later released to NMI.

Again, radon release and employee exposures were not monitored in any process area in this time period. It was not believed to be a significant health risk. It is unlikely that NIOSH is aware of the recent DoE disclosure of enriched uranium recycling and contamination of depleted uranium used by NMI. There was a level of complacency at NMI over the issue because of the prevailing view regarding the levels of radioactive nuclides contained within the highly purified depleted uranium that is now shown to be false.

This enriched uranium recycling disclosure further exacerbates the concern for distilled daughter products that would have been present in reduction and foundry tooling. It may help explain why, despite repeated efforts to improve employee monitoring in the late 1980s, overexposures of employees continued to occur.1

Lastly, this recent disclosure and the observations over the lack of employee monitoring and lack of respiratory protection, further supports our belief that NIOSH is unable to accurately assess employee exposures between 1970 and 1983.

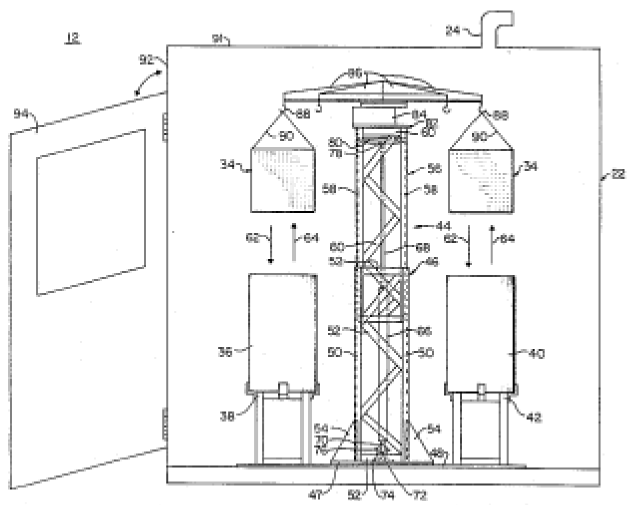
7. Patented Carousel Chip Cleaning & Drying System to Prep Machine Chips for Briquetting Resulting in Fires and Unmonitored Airborne Contamination

Location: Building C, near 300 Ton Extrusion Press
Approximate Date: 1980-1983
Government Contract: M774 Machine Chip Recycling", DoD Contract No. DAAK10-80-C-0246, September 1980 and June 1983.
Additional Supporting Documentation: Uranium

This activity involved a recycling process patent was awarded for cleaning and dewatering machine chips for subsequent vacuum induction remelting. It was important to have extremely dry briquetted chips in order to obtain a decent vacuum in the furnace. Patent rights were assigned to Nuclear Metals, Inc.

got the idea for this approach after visiting the National Lead of Ohio Feed Materials Production Plant where they recycle 3% enriched fuel element uranium. built a carousel style mechanism that automatically transferred 5-pound baskets of uranium chips to sequential washing, degreasing and drying stations. ended up with very dry and clean machine chips as feed material to our 250-ton

Briquetted DU machine turnings removed from foundry crucible. DU metal trapped in oxide layers could not be reclaimed. Note DU oxide powder everywhere in work area.



United States Patent [19] Walz
[11] Patent Number: 4,501,073
[45] Date of Patent: Feb. 26, 1985

Birdsboro briquetting process. Of course, when uranium chip are very dry they become extremely pyrophoric (a tendency to spontaneously burn).

remember demonstrating this pyrophoric property by taking a handful of dry chips and slightly moving my fingers. The slight movement of the chips provided enough friction so that you could see sparks jump from chip to chip. No ring badges were worn. or PAM

Each station of the carousel was ventilated. However, when removed the chip basket frequently had fires. A basket of burning chips would be placed on the concrete floor and smothered with Ansul dry fire extinguishers (powdered glass) to suffocate the fire. There were no air vents in the working area other than where specifically mentioned. recall having parts of my clothing soaked with 1-1-1 Trichloroethylene during these experiments.

Several different manufacturing technicians would assist , depending upon individual availability that day. wore no special personal respirators and were not equipped with PAMs.

8. Uranium Penetrator Test Range Fragment Recycling and Unmonitored Airborne Exposure to Contaminated Dust

Location: Building A Chemistry Laboratory (Art Dodge's Lab)
Approximate Date: 1981-1982
Government Contract: US Air Force Armament Laboratory, Eglin AFB, Contract No. F08635-79-C-0267
Additional Supporting Documentation: Photos and USAF AFATL Report No. AFATL-TR-82-49 Appendix D

Under this contract processed waste drums containing uranium bullet fragments, aluminum sabot remnants and test rand sand. When these bullets impacted the test stand at high velocity, the energetic impact would cause them to burn. This produced a high content of uranium oxides in the uranium bearing waste. The photos were taken in Art's Chem Lab where we manually withdrew the waste from 30-gallon drums using a garden rake. then shoveled and scraped the debris into 2 feet x 3 feet baskets for screening and cleaning. This was the original screening step to separate solid fragments from the sand.

Post water rinse for first cleaning

Post nitric acid etch.

There was no significant ventilation of the work area and we did not wear respirators or PAMs. exposure to uranium dust was unmonitored. From what recall of this activity were exposed to unknown quantities of contaminated dust with a high likelihood of inhalation and ingestion. passed away several years ago.

Initial inspection of 55 gallon drum scrap. Waste composed of sand, uranium bullet fragments and aluminum sabots.

was one of most liked employees. As an he was the go to guy when you wanted to get something done. The story of his placement of goldfish in an ultrasonic inspection tank during a critical customer visit in order to stick it to his boss at the time were legend. He frequently hosted popcorn break parties in his lab. passed away shortly after his retirement.

9. Developmental Molten Salt Recycling of Uranium Chips and Unmonitored Airborne Exposure

Location: Building C, near 300 Ton Extrusion Press
Approximate Date: 1980-1983
Government Contract: M774 Machine Chip Recycling", DoD Contract No. DAAK10-80-C-0246, September 1980 and June 1983.
Additional Supporting Documentation: USAARDC Report No. ARLCD-CR-83018

As part of the US Army recycling contract, evaluated a prototype molten salt remelting technique for uranium machine chips. designed a small induction heated graphite crucible that was filled with molten salt at a temperature well above that of the uranium chips desired to remelt (approximately 1350 - 1550 ^{o}C).

would drop in small quantities of machine turnings that were previously dried with the carousel drier discussed in Item 7. This produced occasional fires from the drying operation or with small quantities of stored and dried chips.

The furnace was only equipped with a moveable 6" diameter vent that we positioned over the furnace. would feed chips into the top of the furnace is small batches to try to get them to sink beneath the molten salt before igniting. were not always successful. When the chips ignited, they would quickly flash and flame due to exposure and proximity to the extreme furnace temperatures. On occasion our machine chips were not completely dry. When these would hit the super heated molten salt the reaction was quite violent. This would cause the ejection of molten salt from the top of the crucible. Fortunately were never injured but airborne exposures are of concern.

The vent was not totally effective in containing the release of airborne contamination. were not wearing personal respirators or PAMs. Any exposure to airborne contamination was unmonitored.

10. Off Site Heat Treatment Experiments and Unmonitored Exposures

Location: Cleveland
Approximate Date: 1981
Government Contract: Internal Funded R&D
Additional Supporting Documentation: None

were tasked with transporting 1800 pounds of uranium rods to a Cleveland equipment vendor for the conduct of heat treatment experiments. drove the rods in a Ford Country Squire station wagon to Cleveland where assisted in allowing the vendor to use their equipment to demonstrate that their equipment could perform the required heat treatment. remember the station wagon bottoming out as we exited the plant driveway. were so heavy in the rear that the front wheels looked like they were about to leave the ground.

vividly recall the drive to Cleveland because it was during a gasoline crisis. The station wagon was so loaded down with uranium that forced to stop at every service station on the Massachusetts turnpike to get the maximum allowable $5 of gas. Even with these frequent stops gas tank level was ratcheting down and barely made Cleveland with any gas in the tank.

The heat treatment required that the rods be heated to 1550 ^{o}F (red heat) and then transferred to a water quench tank. These experiments were conducted and not monitored for airborne contamination and exposures. did not even wear a film badge when driving the uranium to Cleveland or at the vendor's plant.

11. Off Site Ordnance Testing and Unmonitored/Unavailable Exposures

Location: New Mexico Institute-TERA Group and Los Alamos National Labs
Approximate Date: 1980 – 1987
Government Contract: Various, including DoE administered DARPA contracts
Additional Supporting Documentation: Photos and Final Technical Reports, Appendix D

In 1980 began to get involved in the development of explosive shaped charges that used depleted uranium components. was the involved in all of these activities and advanced to an position for this increasing activity in the mid 1980s. In additional, several also participated in this testing as well as other company like .

These activities involved off site testing of these explosive devices at test facilities in Socorro, New Mexico (NMIT TERA Group) and at Los Alamos National Laboratories. The explosions produced extensive amounts of particulated uranium and contaminated steel armor targets. This testing exposed to DU particulates from post-test examination of target damage and the reassembly of contaminated targets for photography and analysis. The testing caused the DU metal liners to liquefy, alloy with the steel targets, and produce a great amount of DU particulates. Other than protective booties and lab coats, no other precautions were taken. Targets were returned to NMI for sectioning and analysis. No air monitors or respirators were used when examining the targets.

Uranium impact target photo inspection. One of many in my collection.

ON THE ROAD AGAIN

by

Equipmental design of DU ordnance components are tested in a remote location. In the above picture climbing into an M47 tank at New Mexico Institute of Technology's TERA facility. (TERA - Terminal Effects, Research and Analysis).

The tank makes a convenient portable mount for the 105mm gun used for range testing. was offered the keys to go for a drive but didn't feel ..., automotive liability coverage was transferable.

Excerpt from NMI Views internal Newsletter of at a Test Range

Any exposure data from these tests are unavailable to NIOSH for consideration of dose estimates. NIOSH has informed that any record of my visits to Los Alamos National Labs are unavailable for consideration in dose reconstruction for open claim. In addition, NIOSH has been unable to find most of the records of visits to Rocky Flats Plant, Y-12 Oak Ridge, Hanford Nuclear Reservation, NLO Feed Materials Production Center, Sandia National Laboratories and Lawrence Livermore National Laboratories. Many of these visits were for other uranium process related work in which was involved.

12. Unmonitored Exposures - Heat Treatment Furnace Maintenance

Location: Building C Mezzainine
Approximate Date: 1978 - 1983
Government Contract: Various
Additional Supporting Documentation: Potential affidavit by Matt Justinger

When penetrator production began at NMI the volumes of uranium that were being handled greatly increased. The first production round was the 30 mm GAU-8 bullet. Production of this round required a heat treatment and quench in an oil bath. Anyone who is familiar with this heat treatment approach knows that the quench reaction is quite violent and spews particulate uranium contamination throughout the furnace interior.

The initial furnaces that were acquired for this production were installed on the area in Building C. There was no restricted access to this area that would frequently visit. recall seeing , t and , performing and activity on these furnaces. He would drain the oil from the furnace and physically get inside the furnace to make repairs. This would sometimes take him hours to complete inside a furnace that was completely and thoroughly contaminated with uranium. He wore no special respirator or PAM and only had his film badge.

This situation is recalled for the likely airborne exposure to which he was exposed, as well as representative of the NMI culture at the time. There was tremendous pressure to meet production goals at he time. A bonus program that rewarded employees monthly based on production benchmarks established the prior month reinforced this pressure. At its peak in the early 1980s, monthly a production goal of 500,000 rounds was typical. Each round weighed approximately one pound. Combined uranium production goals might be 500,000 rounds of US Air Force GAU-8, 350,000 rounds of US Navy Phalanx and 5,000 rounds of US Army large caliber ammunition. This represented a huge quantity of uranium that was processed each month. All three targets had to met to qualify for the monthly bonus. As a result, employees would do whatever was necessary to meet monthly production targets at the expense of safe practices.

13. Unmonitored Exposures – Uranium Liner Forming

Location: Building C 250-Ton Birdsboro Hydraulic Press
Approximate Date: 1978 - 1983
Government Contract: Various
Additional Supporting Documentation: Affidavit by John Kotyk

A new application for depleted uranium emerged after Los Alamos Natinal Labs published a report on DU shaped charges for eastern gas shale penetration. Similar to the fracking method recently reported in the news for natural gas extraction, these shaped charges were used to increase oil well output by fracturing shale formations. began to develop processes to form the required hemispherical shells of DU. This include deep drawing plates of DU into preforms for machining.

Initial forming trials involved heating the forming blanks in a lead bath near the 250-ton Birdsboro press in Building C. Later on switched to using hot oil. After heating, the hot uranium blanks were manually removed from the bath and placed in the tooling mounted within the hydraulic press. This process produced an extensive amount of fumes and smoke. There was no ventilation of the area or respirators or PAMs used during processing, which would take several hours per batch.

This process definitely produced unmonitored exposures to uranium particulates.

14. Unmonitored Exposures – Extrusion Press

Location: Building C
Approximate Date: 1978 - 1983
Government Contract: Various
Additional Supporting Documentation: N/A

One area for cost reduction that was considered were ways to eliminate the copper cladding of uranium billets for extrusion into penetrator bar stock. The manufacturing technicians and set up some experiments to evaluate molten salt as a lubricant for extruding bare uranium rods. We would heat the 4-1/2” diameter x 20” length billets in the area resistance furnace to red heat extrusion temperature (approx 1,100 ^{o}F). Once at temperature, would roll them out of the furnace and apply powdered salts. The salt would immediately melt and coat the billets. would then feed the billet onto the extrusion loader for extrusion.

The hot billets would emerge from the furnace highly oxidized and with occasional surface flames. The heat and flame allowed for uranium particulates to get suspended for possible inhalation. No respirators or PAMs were used and the entire transfer and salt application area was not ventilated.

15. Concord Fire Department Service Calls

Location: Concord Fire Department
Approximate Date: 1970 - 1983
Government Contract: N/A
Additional Supporting Documentation: Concord Fire Department Records, Appendix C

Concord Fire Department service calls to the West Concord plant have the potential to illustrate a number of instances of fires and explosions at NMI. It is unlikely that they were reported to the NRC or state authorities. hope to obtain this service call record in an attempt to prod memory to recall specific reasons for the emergency response. However, it can also be compared to a lack of other reported and unreported occurrences to the NRC and state agencies. Since there was typically no monitoring of employee exposures, reporting employee overexposures was not required.

The Concord Fire Department is currently undergoing renovations. The old service call records were manually recorded on cards and are stored in the attic. It has been a tedious process to gather these records which may not be available when this petition is submitted. As soon as they are received, will submit them.

16. Plant Material Handling, Employee Access and Traffic Pattern Contamination

Location: Buildings A, B, C, D, E and Butler Building
Approximate Date: 1970 - 1983
Government Contract: All
Additional Supporting Documentation: other affidavits

Employee foot traffic patterns in the plant prior to 1983 presented additional difficulties for containing contamination spread. Many product lines required the extensive movement of large volumes of uranium in order to access equipment in locations not optimal to minimizing material handling. It wasn't until entry to all manufacturing areas required passage through a central change area after 1983 that contamination control was somewhat achieved.

Prior to that time contamination control was non-existent. Employees would pass in and out of separate control areas to unrestricted access areas of the plant with trivial, if any, steps taken to minimize contamination spread. It was impossible to adequately control the spread of contamination by the wheels of process carts that were used to transport materials from one area to another.

When was employed as a in 1977, was issued a pair of safety shoes, but not a pair of hot shoes. Hot shoes were used in later years. These would be stored at a restricted access entry point for you to change into when entering a hot area. The use of separate process area shoes was not required for the engineers. was able to enter most, or all processing areas wearing street shoes. The requirement for wearing disposable booties and lab coats was somewhat optional and not an enforced requirement until after 1983.

Gatorade stations were prevalent in most processing areas to prevent heat exhaustion. By the mid 1980s, these stations were moved to the entry change areas for what had become restricted access areas.

In 1981 installed a classified machining and PVD coating lab in Building A for high precision warhead liner manufacture. had a cipher lock installed to restrict access but no clothing/shoe change area for about two years. that were cleared were free to enter and exit without changing shoes or washing hands.

There was also considerable contamination of the main elevator in This elevator was used to transport waste machine chips and grinding sludge to the Butler Building for processing. Ex-employee, , recently informed that the elevator floor was replaced in the 1990s because it was impossible to decontaminate and that the elevator shaft remains highly contaminated to this day. It was impossible with the transport patterns that were used to contain and restrict contamination to process areas. This corridor access to the elevator was the same path used by employees to gain access to the lunchroom, with no change areas in between.

Tacky floor mat applications at some locations were totally ineffective, inadequately monitored for effectiveness and were quite frequently not used prior to 1983. There was no restricted access to chemistry lab on the second floor of during this period. Many workers would gather here at break times to eat, drink and smoke. would make popcorn and show 8 mm movies during the break. This is the same building that housed engineering and administrative offices.

In an attempt to provide evidence of just how loosely H&S standards were, remember a situation where was only employed by NMI for about a month in 1977. had an off site Christmas luncheon and was not much of a drinker. However, did have a few of those drinks that are served in a carved out pineapple. returned to the plant with one of these and went to the in building to offer the guys a drink. The was where we produced 30 mm GAU-8 uranium bullets and was able to enter the area in street clothes and shoes. , a fellow affidavit submitter to this petition, can remember coming to him so could refresh the drink with grain alcohol from his lab. A report got back to supervisor on what had done and was called to his office. didn't get fired but was told that what had done was not a very good idea and not to do it again.

Hand and foot monitoring was first implemented in the mid 1980s for entry and exit from the building from a central location in Building C. When this was first implemented can recall having numerous difficulties getting shoes clean in order to get an acceptable reading. It was still possible to ignore the alarm and exit without difficulty because the guards were stationed a considerable distance away and were not tasked with ensuring that all employees were cleared by the automated monitoring systems. and others, did exit in frustration on many occasions after repeatedly, and unsuccessfully doing the best could to decontaminate our shoes.

Some employees developed ways of fooling the hand and foot monitors. This included using the tips of your fingers to spread the hand monitor and avoiding insertion of your entire hand while placing your feet and shoes outside the expanded metal grid area for the feet.

17. AEC/NRC Archival Records, H&S Violations and Employee Over Exposures

Location: Buildings A, B, C, D, E, Butler Building and external grounds
Approximate Date: 1970 - 1983
Government Contracts: All
Additional Supporting Documentation: other affidavits, Appendices A, B, F & I, Reports and articles

An on line search was made on the NRC web site in order to uncover reported events from inspections, violations and employee over exposures from inadequate health and safety (H&S) practices. While some documents were available as pdf format files, many others appear to be available only as microfiche. included some of these documents as supporting information for this petition. Other files may have to be requested in the course of evaluating this petition.

It is not clear how NIOSH may distinguish between AEC/DoE sponsored activity and residual contamination from such activity, or why this distinction may be important to the administration of claims. However, CP-5 enriched fuel element production and storage in the Butler Building was on going up to at least 1974. Other reactor fuel rod braze ring contracts requiring a Beryllium alloy were also active within the time period covered by this petition. Beryllium processing was constant during this period. DoE sponsored contract work was funded well into the 1990s and included the AVLIS Program for DoE laser enrichment of depleted uranium bars produced by NMI West Concord. A list of AEC and DoE contracts awarded to NMI West Concord are submitted with this petition as Appendix F.

There was also a period in NMI's history when Massachusetts became an "agreement" state, at which time occurrences of employee over exposures were no longer reported to the NRC. Robert Halloran was the point of contact at that time with the Massachusetts Department of Health, Division of Radiation Control. If needed, it may be possible to uncover further evidence of reported employee over exposures through this source.

The various AEC reports from 1974 (see Appendix A) vary between outrage of "deplorable" safety standards, a direct quote from this correspondence, to complimentary for efforts to take corrective action. When you consider the observations for a lack of employee monitoring and contamination control in this, and other, affidavits, which is the more likely? The 2006 EPA report (Report No. EPA-402-R-06-011 in Appendix A) shows that past violations included the improper, and perhaps illegal, disposal of radioactive waste at the West Concord site. The site is now an EPA superfund site on the National Priority List.

The circa 1993 assessment report by the Division of Waste Management illustrates a legacy at the site of gross contamination of ground water that has yet to be fully mitigated at the West Concord plant. The 2006 EPA report and NMI case study (see Appendix A, EPA Report No. EPA-402-R-06-011, Page 32), and as many of us at NMI had heard stories over the years, were comprised of contaminated waste drums found buried at NMI West Concord. This waste was buried at NMI when they moved in 1958 from the Cambridge Hood Building. This represented legacy-contaminated waste from AEC sponsored AWE work performed at the Hood building in Cambridge, MA. The 2004 Environmental Magazine article (Appendix I) reported 3,800 drums were found buried at the West Concord site.

The 1974 AEC report previously mentioned accepted from NMI management a statement that all waste associated with their expiring source license was cleaned up. The AEC never independently verified this and this was obviously untrue as the buried drums attest.

In the 1974 report, both Ralph Franks and Al Gilman handled responses to NRC criticisms. Neither of these individuals had formal training or education in radiation health physics.

Another document that was uncovered involved administrative law proceedings against Starmet in South Carolina (Appendix I). Starmet was the company name that NMI changed to in the 1990s. This document shows a pattern of ongoing health & safety violations over an extended period of time and collusion by management to send and store waste in West Concord. After being told to stop this practice by Massachusetts authorities, management sent waste to South Carolina in violation of regulatory orders not to do this. There were so many violations of H&S practices that SC eventually imposed severe, unpaid, civil penalties and ordered their shut down. The National Guard was sent in to enforce this shut down.

The documents disclose a "sham recycling company" division that was set up to facilitate the improper storage of wastes. Reading the litany of violations during this latter period reminded me of the many ignored standards in the 1974 AEC/NRC documents and criticisms.

In a separate affidavit by , contamination from enriched uranium metallographic samples were never removed from equipment in the early 1970s. This residual contamination was still present and unknown by later hired employees, , that used this equipment.

Were these the actions of responsible management? How much can trust from the official reports from this management, the AEC or NRC? I believe it is more accurate to say that NMI health and safety standards were deplorable for many years. Any comforting statements in these reports about a lack of inspection violations or adequacy of planned corrective actions are reputed by the recollections in this and other affidavits.

For the period covered by this petition there are some fairly severe violations of safety and monitoring practices including the record of contamination spread from the plant to employee homes in 1974. (see Appendix A for various AEC reports) have a limited recall of a similar problem being uncovered in the early 1980s but can find no official records.

know that depleted uranium bullets manufactured at the plant were found in an employee's home. At a minimum, this demonstrated very poor control of radioactive materials containment within the plant. Many years ago, returned my two-pound collection of uranium bullets to NMI. Yes, also took these from the plant. justified my ability to possess less than 15 pounds of depleted uranium without requiring an NRC license. This is what was repeatedly told when wished to perform off site evaluations of depleted uranium processing at non-licensed facilities.

The records show a repeated failure by NMI management to take effective corrective actions that prevented the same violations from recurring. Reported and documented employee over exposures illustrates a failure to prevent such over exposures well into the 1990s.

There is an evolution of the company during and outside the time frame of this petition that is worth considering. From 1970 until 1983 the company was quite small. I was the 125th employee in 1977. A certain critical mass in staffing is necessary for a robust H&S program. It wasn't until after 1983 that growing staffing levels and increased staff competency allowed for this. During the 1970 – 1983 period, Mr. Ralph Franks and Mr. Al Gilman had responsibility for ensuring employee safety. Neither individual had a formal education or training in radiation health physics.

Regardless, change was slow as business volume increased and costs associated with changes to the way things were done were increasing significantly. These were resisted and allowed for deficiencies in H&S practices longer than should have been permitted.

Significant costs were associated with the implementation of hand and foot monitors at the main entry point and the closure of the entrance lobby to employee entry and exit in the mid 1980s. Additional expensive changes included the investment in a significant increase in graphite foundry tooling in order to allow for a cool down period to reduce employee exposures in the foundry. don't ever recall this approach being taken for green salt reduction area tooling at West Concord that predated the foundry practice changes.

The September 2000 report by Radioactive Waste Management Associates indicates that there is appreciable contamination, well above background levels, in the areas surrounding the NMI West Concord plant. It reports that unmonitored workers were exposed to airborne contamination while eating their lunch at outside picnic tables and walking to their cars in the parking lot. Contamination of exterior surfaces, like the parking lot, was most likely contaminated by a combination of foot traffic and airborne releases. The extent of external plant contamination, up to 0.5 km, could only have come as a result of airborne releases from plant ventilation exhaust.

It was reported that in 1980, drinking well SW-2A was contaminated with eight different VOC compounds. Up to 350 employees worked for NMI West Concord at that time and were contaminated by this drinking water. It does not indicate whether this specific well was tested for radionuclide contamination at that time. However, it reports that many other wells exhibit high levels of radionuclide contamination. This report has other referenced reports by the EPA, CFR and other sources that could provide additional information and data on this contamination.

This overview shows that there was a distinct difference in the quality of the H&S program before and after 1983. The fact that eating, smoking and drinking were still permitted in many process areas up until the early 1980s illustrates this contrast in H&S practices. can recall seeing many workers eating their lunch in contaminated process areas. Was this permitted behavior consistent with a management that would have required process area monitoring during this period, or required the use of PAMs during high-risk activity for airborne contamination? From
know this data was never collected.

How can exposure data from the mid to late 1980s be extrapolated back to this earlier time period and provide an accurate assessment of dose reconstruction? Many NMI West Concord claims have limited data from this petition time period, particularly for internal uptakes and exposures when so many immature processes and hazardous developmental activities were not monitored. How can single point urinalysis data used in some claim dose estimates, from time periods outside the 1970-1983 time frame, be considered a statistically accurate assessment of employee exposures? High solubility uranium compounds, like UF_4 and UO_2F_2 target the kidneys and are excreted very quickly. They would not be present in urinalysis data from the mid to late 1980s.

The cancer causality models used by NIOSH assume only radiation exposure and do not consider chemical toxicity of high solubility uranium compounds and their carcinogenic effects. This establishes a very high bar for cancer causality that does not reflect the true potential for unmonitored internal exposures and their causality related cancers. How can this be claimant favorable? It appears to NMI West Concord claimants that NIOSH dose reconstruction and cancer causality models are designed to reject as many claims as possible.

also reconstructed NMI West Concord employee claim statistics and reviewed many of their dose reconstruction reports (Appendix B). determined that there is a high probability that the DoL has included employees that worked at the SEC status Cambridge Hood Building in statistics for NMI West Concord. They may also be including an award for Beryllium exposure in with uranium exposure claims in the claim statistics reported by DoL.

As a result, able to identify only one person, , who has worked exclusively at the NMI West Concord facility who has received an award under the EEOICPA Program for uranium exposure. That award was made only after his heirs engaged a lawyer to pursue his claim. One claimant even received a causation level of 48.9% and was rejected.

This makes the basic statement that <u>NIOSH protocols for establishing employment related cancer causality and dose reconstruction conclude that there were very limited, employment associated, radiation-based hazards at NMI West Concord that could have caused cancer in these employees.</u> This judgment is further compromised by the recent DoE disclosure of enriched uranium fuel rod recycling and contamination of DU. This judgment appears to be totally unreasonable when considering the evidence presented in this petition. In light of the evidence submitted with this petition, have claimant favorable estimates for internal exposures considered the severity of these chronic unmonitored exposures to high solubility airborne particulates?

Lastly, when you consider all of the unmonitored activity was permitted to engage in, was not unique. Radon was not on radar for concern and monitoring. However, in the mid 1980s became aware of potential risks and steps were taken to evaluate the issue. unaware of the outcome of any monitoring other than the problem was also uncovered at CMI in Barnwell, SC in the 1990s. What health risks were associated with these unmonitored exposures at NMI, West Concord? How were these exposures exacerbated by the enriched uranium contamination of DU recently disclosed by the DoE? The SC Department of Health & Environmental Safety may be able to tell us from their records of the details of radon problems at CMI. They can be contacted via e-mail at radon@dhec.sc.gov.

18. Summary

In aggregate, feel there is ample evidence to seriously question the feasibility of NIOSH to estimate external doses, and particularly internal dose levels of radiation for individual members of the class with sufficient accuracy.

further suggest that there is a reasonable likelihood that chronic exposures to a range of uranium compounds through unmonitored intakes of radionuclides resulted in sufficiently high doses that endangered the health of members of the proposed class. It is unlikely that NIOSH has factored in additional radiation exposures from the DoE's enriched uranium fuel rod recycling that contaminated the DU used for penetrator manufacture. In addition, there is the potential for unmonitored radon exposures, particularly from unexpected radionuclides present from the prior fission of uranium in the recycled spent fuel rods.

Any site profile for NMI West Concord should specifically address these allegations that there was a fundamental lack of health and safety control, lack of employee monitoring for radioactive doses, lack of work area monitoring of airborne contamination, consistent lack of effective corrective action by management, missing employee exposure data, higher levels of U_{235} and other radionuclides not associated with typical depleted uranium concentrations, and that there were secondary exposures (i.e. exposure of family members) to radioactive contamination. have been unable to identify an official NIOSH site profile for NMI West Concord.

These observations and supporting reports all contribute to a finding that NIOSH would be unable to perform internal and external dose reconstructions that are scientifically sound and claimant favorable.

In particular, seek a finding that the information available from sources is not sufficient to document or estimate the maximum internal doses to NMI West Concord workers under plausible circumstances for the specified period.

The occurrences and situations described in this affidavit are truthful and the best capable of recalling from at NMI, West Concord, MA. educational background includes

. However, while have no particular expertise or training in radiation health physics, present this in support as a qualified observer of the health concerns raised in this affidavit.

Notarization of this affidavit is provided for all 24 pages, and includes referenced documents, supporting affidavits provided in Appendices A through I, CD and DVD.

Signed this day of , 2011

List of Appendices and Supporting Documents

Appendix A – NRC web site search for documents relating to NRC license SMB-179 and results of available as pdf and microfiche documents along with copies of the following documents.

February 1974 AEC Unannounced Inspection Report, List of Violations and Questions of Plant Operation Safety and "Deplorable" Conditions.

March 1974 AEC Consideration of Civil Penalties Unannounced Inspection Report CP5 Production

June 1978 NMI report of worker over exposure

1982 March NMI Report on 1981 worker over exposure

1984 May NMI report of worker over exposure

1996 February NMI Vent Fire Report

circa 1993 Analysis of Nuclear Metals Site (ground water contamination) by Performance Assessment and Hydrology Branch, Division of Waste Management, Office of Nuclear Materials Safety and Safeguards.

1996 AEC/NRC license history of NMI, 1942 to date

2006 EPA Report No. EPA-402-R-06-011, Page 32, of radioactive waste and drums buried in prior years at NMI West Concord site

Appendix B – Independently reconstructed DoL claim statistics for NMI Hood Building and West Concord employees compiled by and .

Appendix C – NMI Concord Fire Department emergency service call records between 1970 and 1983.

Appendix D – Covers and excerpts from technical reports referenced in the affidavit by

Appendix E – Affidavits submitted by NMI employees in support of this petition

Appendix F – List of AEC/DoE Contracts with NMI between 1970 and 1983

Appendix G – List of NMI employees and contact information for a future NIOSH outreach effort for additional information.

Appendix H – EPA NPL Site Narrative (NMI)

Appendix I – Radon, CMI and NMI referenced documents